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G91-1045 Turfgrass Weed Prevention and Management (Revised December 1994)

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Turfgrass Weed Prevention and Management

This NebGuide discusses control strategies and recommendations for weed control in turf.

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Weeds are a major problem in lawns and normally are the most visible of turfgrass pests. Weeds affect the function, health and appearance of the turf as they compete with desirable turfgrass plants for space, light, water and nutrients.

The presence of weeds is often the result of improper turfgrass management or poor site preparation. Weeds are very opportunistic and become established most readily in thin, weak stands of turf. The best defense against weeds is a thick, competitive, well-managed turf. Although herbicides can be used in an integrated weed management system, spraying alone will not produce satisfactory, long-term weed control. Determine why the weeds have invaded the turf and correct the problem. If the basic cause is not corrected, weeds will continue to infest the turf.

Weed Control Methods

Cultural Practices

Proper management can do much to encourage a dense, vigorous turf and discourage weeds. The most common causes of poor turf and weedy lawns are improper mowing, fertilizing and watering and inadequate drainage. Soil compaction, disease and insect outbreaks can also thin turf stands, allowing weeds to invade. Use of adapted cultivars, proper mowing height, fertilization, irrigation, soil drainage modification and a number of other cultural practices will promote a competitive turf. Refer to Extension Circular *EC 1557, Integrated Management, Guide for Nebraska Turfgrass* for more information on recommended cultural practices.

Mechanical Control

Tillage prior to lawn establishment can be considered one example of mechanical weed control. The seed bed should be prepared a few weeks ahead of seeding. A final shallow tillage operation just prior to seeding

should destroy any weed seedlings that have germinated since the last tillage.

Mowing is basic to turfgrass culture and is also an example of mechanical weed control. Unfortunately, most weeds which infest turfgrass areas can tolerate close mowing heights. In the case of slow growing turfgrass species such as buffalograss, mowing can be an effective weed control tool. Annual weeds will generally grow faster than buffalograss, particularly in the early spring. Although the turf does not need to be mowed, many erect growing weeds can be controlled in this manner.

Digging or pulling weeds are simple and effective ways of controlling small weed infestations. This works best for annual weeds, but may provide only temporary relief for deep-rooted perennials. Dandelions, for example, should be cut 2 to 4 inches below the soil surface to assure control.

Sanitation

Sanitation, although more commonly used for disease control, also can be an effective means of alleviating weeds. Sanitation refers to the physical removal or avoidance of placing undesirable plants where they are not wanted. Violets, often planted in flower beds can become established in turfgrass, where they are a troublesome pest. Avoid planting species such as violets close to the edge of flower beds where they can readily invade the turf. Another example of sanitation is keeping mowing and edging equipment clean. A mower may pick up a sprig of zoysiagrass from an adjacent turf and move it to a section of bluegrass turf. If conditions are favorable, the zoysiagrass can become established in the bluegrass.

When establishing a turf, make sure to buy the highest quality seed available. Low quality seed often contains weed seed. One way to ensure the seed you buy is high quality is to only buy certified seed, which indicates what percentage, if any, weed seed is present and guarantees the genetic purity of the seed bag.

Chemical Control

Herbicides provide an effective and convenient method of controlling weeds in turf, but should be considered supplemental to proper cultural and mechanical control methods. Care should be used when applying any herbicide. Improper use can result in poor weed control, turf injury or injury to sensitive ornamental or garden plants. Always follow pesticide label directions exactly.

Herbicide Selection

For the most part, herbicides are specific as to which weeds they control and proper selection depends on identifying which weeds are present. Herbicide selection also depends on what turfgrass species is present. Because turfgrasses vary in their tolerance to herbicides, using an inappropriate herbicide could severely injure your lawn. Read the product label to determine which weeds it controls and which turf grasses are tolerant to the herbicide.

Because herbicides are selective, proper identification of the weed is the first step in developing a control strategy. If you are unsure what weeds are present in your lawn, take a plant sample to your local county extension office or lawn and garden center.

Weed Classification

Although weed identification is the first step, knowledge of a weed's life cycle can also be important when developing a management strategy. Annuals require one year or less to complete their life cycle, which means they germinate from seed, mature and produce seed for the next generation in less than 12 months. Winter annual weeds, such as henbit and shepherdspurse, germinate in the fall, overwinter and complete their lifecycle the following spring. Winter annuals are most easily controlled in the fall when they are small. Higher herbicide rates are required to control the weeds in the early spring before flower stalk development.

Summer annuals, like crabgrass and prostrate knotweed, germinate in the spring and die with the first fall frost. Summer annuals are most easily controlled in the early spring before they germinate or when they are still small and actively growing. As they get larger, control with herbicides is more difficult.

Biennials require two years to complete their life cycle. They form a rosette the first year, then flower and die during the second year. Many thistles are biennials. Biennials are most easily controlled in the fall or early spring when the plants are still in the rosette stage. Control becomes difficult once flower stalk elongation occurs.

Perennials, plants which live for more than two years, may live indefinitely. Many perennials grow from seed, but some arise from reproductive structures such as tubers, roots and rhizomes. Examples include dandelion, ground ivy, quackgrass and yellow nutsedge. For best results, treat perennials in the fall, prior to a hard freeze, as herbicide movement into the root system is greatest at this time of year. The second best time would be just prior to flower initiation when food reserves in the root system are lowest and the weed is more susceptible to herbicide injury.

Types of Herbicides

Preemergence Control:

Herbicides applied to the turf before weed seeds germinate are referred to as "preemergence", "preemergent" or "preventer". They are primarily used to control annual grasses such as crabgrass, but may control certain annual broadleaf weeds as well. For these products to be effective, they should be applied a few weeks prior to weed germination. A second application is sometimes needed to provide season-long control.

Crabgrass will germinate when soil temperatures reach 55°F. In southern and eastern Nebraska, preemergent-herbicides should be applied about mid-April. Applications would normally be delayed about one to two weeks for the western and northern parts of the state. However, weather conditions vary from year to year and herbicide timing needs to be adjusted accordingly. If crabgrass is seen germinating in bare areas next to sidewalks or driveways, it is time to apply a preemergence herbicide to the lawn.

For winter annual broadleaf weeds such as henbit, or early season summer annual broadleaf weeds like knotweed, the appropriate preemergence herbicide should be applied in mid-September. Germination, however, may continue through the early spring.

There are several steps to take in order to optimize the performance of preemergence herbicide products.

Lawn Preparation: For preemergence herbicides to be effective the product must reach the soil where weed seeds are present. Proper lawn preparation will maximize the amount of product reaching the site. Rake and remove trash, thatch, leaves and excess dead grass from the lawn so that interception will be minimized. This also will allow the soil surface to warm quickly and enhance turf growth.

Mowing: Mowing the lawn prior to preemergence herbicide application minimizes herbicide interception. Research conducted at the University of Nebraska has shown that up to 95 percent of the applied preemergence herbicide may be retained on the turfgrass leaves, never reaching the soil. By mowing prior to treatment, less material will be intercepted by the turf and more will get to the target site.

Application: Apply the product as directed on the container. Double coverage at half-rate in two directions assures a more even distribution than a full rate applied in one direction. Do not apply granular formulations to wet turf. When using granular formulations, make sure any product which falls on the sidewalk or driveway is swept up.

Irrigation: It is critical to water preemergence herbicides as soon as possible as irrigation moves the product

into the soil where the weed seeds germinate. Without irrigation or rainfall soon after application, the product will stay on the turf and be degraded by sunlight, significantly reducing weed control.

Label Guidelines: The following table of preemergence herbicide formulations are for basic products marketed under a variety of brand names for the retail market. For that reason, the common name (e.g. benefin) has also been included as a reference. The information is meant to serve only as a guide for herbicide selection and does not include complete label instructions. Read the label and follow the appropriate rate and application instructions on the container.

Reference to trade or brand names is only for the convenience of users. Mention of a product does not constitute an endorsement, guarantee or warranty by The University of Nebraska.

Table I. Preemergence Treatments For Established Turf	
Herbicide	*Remarks*
benefin BALAN 2.5G BALAN 60DF	For the control of annual grasses. Make first application in mid- to late April. Make a second application eight to 10 weeks later. Use lower rate on fine-leafed fescues. Can be applied in the spring to turf planted the previous fall if the grass is well established and has been mowed four times.
benefin + oryzalin XL 2G	For the control of annual grasses and certain broad-leaf weeds in warm season turf and tall fescue. Apply in mid- to late April for summer annual grasses and broadleaf weeds. Apply in late summer for winter annual broadleaf weed control. Use lower rate on fine-leafed fescues. Do not apply in the spring to turf established the previous fall.
benefin + trifluralin TEAM 2G	For the control of annual grasses. Apply in md-to late April. Make a second application eight to 10 weeks later. Use lower rate on fine-leafed fescues. Do not apply in the spring to turf established the previous fall.
bensulide BETASAN 7G BETASAN 4E	For the control of annual grasses. Apply by mid-to late April. Use lower rate for crabgrass, higher rate for other annual grasses.
DCPA DACTHAL 5G DACTHAL 75W DACTHAL 6F	For the control of annual grasses and certain broad-leaf weeds, including spurge. Use lower rate forcrabgrass, higher rate for other annual grasses. Make first application in mid- to late April. Make a second application eight weeks later. Can be applied at lowest rate to seeded turf that is 1 to 2 inches tall.
isoxaben GALLERY 75DF	For the control of certain broadleaf weeds including chickweed, henbit, knotweed, mustards, oxalis, plantain and spurge. Apply in early fall or early spring prior to the germination of the target weeds. Can be applied to newly seeded turfgrass when the grass has three or more leaves. Isoxaben should be applied at least eight weeks prior to overseeding.
oryzalin SURFLAN 4 AS	For the control of annual grasses and certain broadleaf weeds in warm season turf grasses and tall fescue. Make first application in mid to late April. Make a second application eight to 10 weeks later. Do not apply to weakened turf or in the spring to tall fescue seeded the previous fall.
oxadiazon RONSTAR 2G	Labeled for use on buffalograss as well as cool- season turf. For use by commercial applicators only. Apply in mid- to late April. Do not apply to wet turf or newly seeded areas.
pendimethalin LESCO PRE-	For the control of annual grasses and 60 DFcertain broadleaf weeds including

M SCOTTS WEEDGRASS CONTROL	spurge. Apply in mid- to late April and make a second application later. Can be applied to newly seeded areas once the turf has been mowed at least four times.
siduron TUPERSAN 50WP	For the control of annual grasses in newly seeded areas, as well as in established turf. For new spring plantings, apply following seeding and use the lower rates listed. Make a repeat application one month later. For new fall plantings or in established turf, use higher rates and apply by mid-April.

Postemergence Control

Postemergence herbicides are applied once the weed has emerged and are applied to the foliage of actively growing weeds. One benefit of postemergence herbicides is that the product can be used as a "spot treatment" to individual weeds or areas. This not only saves time, but also money. Most postemergence herbicides control broadleaf weeds, but some are available which control grasses as well. Regardless of the type of weed, there are several factors which influence the effectiveness of postemergence herbicide applications.

Timing: For annual weeds or the seedlings of perennials, control is easiest to achieve when the weeds are small. As weeds age, changes in leaf surface characteristics, growth habit and physiological function occur. These changes result in reduced herbicide uptake and translocation. The larger the weed, the more difficult it is to control, and it may require higher rates or repeat applications. Aside from control aspects, allowing the weeds to grow and compete with the turf longer than necessary results in a thinner, less competitive turf. For established perennials, treat in the fall of the year, prior to a hard freeze. The second best time would be just prior to flower initiation.

*Healthy Weeds:*Weeds are more susceptible to herbicides if they are actively growing at the time of application. Any stress which reduces the vigor of the weed often results in less herbicide uptake and translocation, the end result being erratic control. It is best to apply the herbicide when the soil is moist and the air temperature moderate. If soil moisture is lacking, water the lawn a few days prior to the intended spray date. Early morning or late afternoon applications are best. At these times air temperatures are low and water stress is at a minimum. If weeds are under stress, herbicide activity may be improved by the addition of a surfactant. Make sure to check the herbicide label for surfactant recommendations.

*Irrigation and Rainfall:*Postemergence herbicides must be retained on the leaf surface of the weed so the material can be absorbed and translocated within the weed. Although these herbicides have some soil activity, most of the weed control benefits are from foliar activity. If irrigation or rainfall occurs shortly after application, significant amounts of the herbicide can be washed off the weed, resulting in reduced control. Generally there needs to be an eight-hour, rain-free period after application.

Mowing Considerations: The target weeds must have enough leaf surface present to intercept a lethal dose of the herbicide. To insure adequate leaf surface, don't mow the area prior to spraying for weeds. Ideally, the area should not be mowed for two to three days before treatment. After treatment, allow another three to four days before mowing. This will allow enough time for the herbicide to thoroughly translocate within the weed. Mowing too soon after application removes the treated portion, resulting in incomplete control.

Following the above guidelines, six to seven days could pass between mowings. In the spring of the year, this time lapse can result in significant amounts of turf growth. When you do mow, do not remove more than 30 to 40 percent of the turf leaf blade in any one mowing. For example, if your turf is 4 inches tall, do not mow lower than 2.5 inches. Removing more than 30 to 40 percent results in reduced turfgrass vigor and rooting. The initial mowing height after a postemergence herbicide application could, therefore, be higher than the desired or previous mowing height. Remember to adjust your mowing height accordingly.

One final consideration with respect to herbicides and mowing is the use of clippings. Much of the postemergence herbicide is retained on the leaf blades of the turfgrass, and the residual activity of the herbicides can last three weeks or more. Returning the clippings to the lawn is the best option. Rainfall or irrigation could then wash the residual herbicide from the clippings into the soil, providing additional weed control. If clippings are removed, do not use them for mulch around sensitive plants until the area has been mowed at least four times. These clippings can, however, be used in a compost pile.

Postemergence Grass Control:

Postemergence control of annual grasses is not as effective as preemergence applications. Organic arsenical herbicides, such as Daconate, Dal-E-Rad (MSMA) and Methar 30 (DSMA), usually require two or three applications per season, spaced one to two weeks apart, starting when crabgrass is young, in the three to five leaf stage. These herbicides may injure turfgrass, especially during hot weather.

A newer herbicide, Acclaim (fenoxaprop), has provided excellent crabgrass control when applied to crabgrass that has not yet developed seedheads. Control is more complete when crabgrass is treated at smaller growth stages and lower rates can be used. Acclaim must be applied by commercial applicators.

Most perennial grasses, including windmill grass, smooth brome, nimblewill, and quackgrass cannot be selectively controlled in turf. In most cases the turf is killed along with the undesirable perennial grass weed and the area must be reseeded. Roundup is the nonselective herbicide most often used in these cases. Allow at least one week after application before reseeding the treated area. Tall fescue can be selectively controlled in turf with Lesco TFC (chlorsulfuron). Lesco TFC must be applied by a commercial applicator.

Yellow nutsedge is a perennial weed with a grass-like appearance. Postemergence herbicide applications offer the control for this troublesome turf weed pest. The most consistent control is obtained with applications of Basagran (bentazon). Because the emergence of yellow nutsedge can occur throughout the season, repeat applications are usually necessary. The other option would be to use repeat applications of organic arsenicals such as MSMA or DSMA.

Postemergence Broadleaf Control:

There are many products available to control broadleaf weeds in turf. Usually these products are combinations containing two or more herbicides. Those products readily available to the homeowner usually contain two or more of the following: 2,4-D, 2,4-DP, MCPA, MCPP or dicamba (*Table II*). Combination products have the advantage of controlling more weeds than a single herbicide. For example, 2,4-D is effective on dandelions, but weak on clover. By combining MCPP with 2,4-D, both weeds are effectively controlled (*Table IV*).

In many situations, the reason weeds are present is because the turf is thin to begin with. Reseeding these areas will help reduce future weed problems through competition from the turfgrass itself. If you plan to reseed these areas following a herbicide application, follow the reseeding intervals on the product container. With most postemergence broadleaf herbicides, delay seeding treated areas for three to four weeks after applying the herbicide.

Broadleaf herbicides are available in liquid, granular and fertilizer/granular combinations. Complete coverage is critical for optimum weed control. Generally, liquid formulations provide the best coverage. If granular or fertilizer/granular combinations are used, the foliage must be wet when the application is made.

When using postemergence broadleaf herbicides, care must be taken to minimize drift. Drift results from the physical movement of the spray particle or the volatilization of the herbicide from a liquid form to a vapor. In either case, nearby sensitive plants can be damaged.

Use low-volatile herbicides when available. Many postemergence broadleaf herbicides are formulated as

amine salts or esters and the container label will indicate the formulation. Amine salts are preferred, as they are less volatile than esters.

Try to make applications when wind speeds are low, preferably below 5 MPH and the air temperature is low (75°F). Volatile herbicides have a greater potential to cause injury as air and soil temperatures increase. Try to apply herbicides early in the morning or early in the evening when winds are calmer and temperatures lower. For more information on minimizing herbicide drift, refer to *NebGuide G90-1001, Spray Drift of Pesticides.*

Table II. Commonly used postemergence broadleaf herbicides.	
2,4-D	2,4-dichlorophenoxy acetic acid
2,4-DP	2-(2,4-diclorophenoxy) propionic acid
MCPA	2-methyl-4-chlorophenoxy acetic acid
MCPP	2-(2-methyl-4-chlorophenoxy) propionic acid
clopyralid	3,6-dichloro-2-pyridine carboxylic acid
dicamba	3,6-dichloro-o-anisic acid
triclopyr	3,5,6-trichloro-2-pyridinyloxy acetic acid

Table III. Examples of broadleaf herbicides.	
2,4-D + dicamba LESCO EIGHT-ONE	**2,4-D + 2,4-DP** CHIPCO WEEDONE DCP
2,4-D + MCPP LESCOPAR 2 PLUS 2ORTHO WEED-B-GON PHENOMEC	2,4-D + MCPP + dicamba TRIMEC CLASSIC LESCO THREE-WAY ORTHO CHICKWEED, SPURGE & OXALIS KILLER
2,4-D + 2,4-DP + dicamba SUPER TRIMEC	**MCPA + MCPP + dicamba** TRIMEC ENCORE
triclopyr TURFLON AMINE	**triclopyr + 2,4-D** TURFLON D TURFLON II AMINE
triclopyr + clopyralid CONFRONT	

Table IV. Susceptibility of broadleaf weeds to postemergence herbicides.					
Weed	*Life Cycle*	*2,4-D*	*MCPP*	*Dicamba*	**Combos+*
Black Medic	A	R	I	S	S
Chickweed, Common	WA	R	SI	S	S

Clover, White	P	I	S	S	S
Dandelion	P	S	S	S	S
Garlic, Wild	P	SI	R	SI	SI
Henbit	WA	IR	I	S	S
Ivy, Ground	P	IR	I	SI	SI
Knotweed	A	R	I	S	S
Mallow	A/B	IR	I	SI	SI
Plantains	P	S	IR	R	S
Speedwell, Corn	WA	IR	IR	IR	IR
Spurge, Prostrate	A	I	I	S	S
Spurge, Spotted	A	IR	SI	SI	S
Thistle, Musk	B	IS	I	S	S
Violet, Wild	P	IR	IR	IS	IR
Woodsorrel, Yellow	P	R	R	I	IR

A=annual, B=biennial, P=perennial, WA=winter annual.
I=intermediate, R=resistant, S=susceptible.
*Combos=combinations of 2,4-D, MCPP and/or dicamba.

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